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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/784,158	02/16/2001	Stephan W. Wegerich	086470/9013	1544

7590 06/02/2005

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EXAMINER	
GUILL, RUSSELL L	
ART UNIT	**PAPER NUMBER**
2123	

DATE MAILED: 06/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No. 09/784,158	Applicant(s) WEGERICH ET AL.	
	Examiner Russell L. Guill	Art Unit 2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *3 February 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21,25-28,31-37,50 and 51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *2 February 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

1. This action is in response to the Amendment filed February 3, 2005. Applicants cancelled claims 22 – 24, 29, 30, and 38 – 49. Claims 50 and 51 were added. Claims 1 – 21, 25 – 28, 31 – 37, and 50 - 51 have been examined. Claims 1 – 21, 25 – 28, 31 – 37, and 50 - 51 have been rejected.

Response to Applicant's Remarks

2. Regarding the section labeled Claim Interpretation:

2.1. The Examiner accepts the Applicant's interpretation with respect to claims 16 and 41.

3. Regarding the section labeled Claim Rejections under 35 U.S.C. 102(b):

3.1. The Applicant's arguments are persuasive, and are accepted.

4. Regarding the section labeled Claim Rejections under 35 U.S.C. 103(a):

4.1. The Applicant's arguments are persuasive, and are accepted.

Claim Objections

5. Claim 31 is objected to because of the following informalities: The claim recites the phrase "divides ***the the*** range". Appropriate correction is required.

Claim Rejections - 35 USC § 101

6. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7. Claims 1, 8, and 13 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims appear to recite an algorithm, which is not a tangible result.

8. Claim 32 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 32 is directed to a "computable program product" without a computer readable medium needed to realize the computer program's functionality, and therefore the claims are non-statutory. The phrase, "a computer readable medium having instructions thereon which cause a processor to execute a process for . . ." would overcome the rejection.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 1, 4, 5, 8, 11, 13, 14, 15, 19, 20, 21, 32, 34, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Black (Black, Christopher L.; Uhrig, Robert E.; Hines, J. Wesley; "System Modeling and Instrument Calibration Verification with a Nonlinear State Estimation Technique", Maintenance and Reliability Conference Proceedings, May 12 – 14, 1998) in view of Freund (Freund, Rudolf J.; Wilson, William J.; "Statistical Methods", 1993), further in

view of Klimasauskas (U.S. Patent Number 6,278,962), further in view of Passera (U.S. Patent 6,272,449).

10.1. The art of Black is directed toward system modeling and instrument calibration verification with a nonlinear state estimation technique (***Title and Abstract***).

10.2. The art of Freund is directed to statistical methods (***Title***).

10.3. The art of Klimasauskas is directed to a method for adaptively modeling and controlling an industrial process (***column 1, lines 7 – 13***).

10.4. The art of Passera is directed toward a process for providing a description of a model that indicates the sensitivity of the model in subspaces of the input space (***column 1, lines 60 – 63***).

10.5. Regarding claims 1, 8, 13, and 32, Black appears to teach receiving signals that represent an operational state of a system, as input from a plurality of sensors, either in real-time or from historical records, and using the signal vectors as a set of training vectors (***pages 58.05 – 58.06, sections labeled "Instrument Calibration Verification System" and "Demonstration of application of nset to modeling of selected high flux isotope reactor (hfir) variables"***); an empirical modeling module responsive to data acquisition for providing indications about the operational states of the system (***pages 58.05, section labeled "Instrument Calibration Verification System" and the unlabeled figure***); a data store for storing modeling parameters (***pages 58.05, section labeled "Instrument Calibration Verification System" and the unlabeled figure***); selecting a system parameter (***pages 58.05 – 58.06, sections labeled "Instrument Calibration Verification System" and "Demonstration of application of nset to modeling of selected high flux isotope reactor (hfir) variables"***); distilling characteristic operational sensor data acquired from the system to a representative set of sensor data to use as a training set for an adaptive

system (***pages 58.05 – 58.06, sections labeled "Instrument Calibration Verification System" and "Demonstration of application of nset to modeling of selected high flux isotope reactor (hfir) variables"; and page 58.01 – 58.02, section labeled "Introduction"***); the training set vectors form an empirical model for monitoring system operation (***pages 58.05 – 58.06, sections labeled "Instrument Calibration Verification System" and "Demonstration of application of nset to modeling of selected high flux isotope reactor (hfir) variables"; and page 58.01 – 58.02, section labeled "Introduction"***);

10.6. Regarding claims 1, 8, 13, and 32, Black does not specifically teach ***ordering the set of*** training vectors ***according to a corresponding value in each vector of a*** particular sensor.

10.7. Regarding claims 1, 8, 13, and 32, Black does not specifically teach ***dividing the set of*** training vectors ***according to equally spaced ranges according to the ordering***.

10.8. Regarding claims 1, 8, 13, and 32, Black does not specifically teach ***selecting at least one vector from each of the equally spaced ranges*** for training the adaptive model.

10.9. Regarding claims 1, 8, 13, and 32, Black does not specifically teach ***computer readable program code***.

10.10. Regarding claims 1, 8, 13, and 32, Black does not specifically teach ***time-correlated observations***.

10.11. Regarding claims 4, 11 and 34, Black does not specifically teach that ***ordering comprises ordering the set of*** training vectors ***according to the magnitude of a*** particular sensor.

10.12. Regarding claims 5 and 35, Black does not specifically teach that a vector is selected from one of the equally spaced ranges through the ordering by magnitude such that the selected vector is the vector with the sensor value highest within the range.

10.13. Regarding claim 14, Black does not specifically teach that selecting a system parameter comprises identifying dominant driver parameters.

10.14. Regarding claim 15, Black does not specifically teach selecting a bin number used in the binning step of claim 14, the bin number determining the number of bins in which the plurality of vectors is divided.

10.15. Regarding claim 19, Black does not specifically teach that in step e) of claim 15 where a vector is selected from each bin, one of the plurality of system vectors is identified as having a value for a selected parameter closest to a bin magnitude of each bin, identified ones being selected for initial inclusion in a training set.

10.16. Regarding claim 20, Black does not specifically teach that in step e) of claim 15 where a vector is selected from each bin, one of the plurality of system vectors is identified as having a value for a selected parameter closest to but not exceeding a bin magnitude of each bin, identified ones being selected for initial inclusion in a training set.

10.17. Regarding claim 21, Black does not specifically teach that in step e) of claim 15 where a vector is selected from each bin, one of the plurality of system vectors is identified as having a value for a selected parameter closest to but not less than a bin magnitude of each bin, identified ones being selected for initial inclusion in a training set.

10.18. Regarding claims 1, 8, 13, and 32, Freund appears to teach <u>ordering the set of vectors according to a corresponding value in each vector of a particular parameter, and dividing the set of vectors according to equally spaced ranges according to the ordering, and selecting at</u>

least one vector from each of the equally spaced ranges (***page 591, Definition 14.3, Stratified sampling; and page 87, figure 2.12***).

10.18.1. Regarding (***page 591, Definition 14.3, Stratified sampling; and page 87, figure 2.12***); it would have been obvious that the vectors are sorted according to a corresponding value in each vector of a particular parameter, and divided into equally spaced strata.

10.19. Regarding claims 4, 11 and 34, Freund appears to teach that ordering comprises ordering the set of training vectors according to the magnitude of a particular sensor (***page 591, Definition 14.3, Stratified sampling; and page 87, figure 2.12***).

10.19.1. Regarding (***page 591, Definition 14.3, Stratified sampling; and page 87, figure 2.12***); it would have been obvious that the vectors are sorted according to the magnitude of a particular sensor.

10.20. Regarding claims 5 and 35, Freund appears to teach that a vector is selected from one of the equally spaced ranges through the ordering by magnitude such that the selected vector is the vector with the sensor value highest within the range (***page 591, Definition 14.3, Stratified sampling; and page 87, figure 2.12***).

10.20.1. Regarding (***page 591, Definition 14.3, Stratified sampling; and page 87, figure 2.12***); it would have been obvious to select the vector with the sensor value highest within the range.

10.21. Regarding claim 15, Freund appears to teach selecting a bin number used in the binning step of claim 14, the bin number determining the number of bins in which the plurality of vectors is divided (***page 591, Definition 14.3, Stratified sampling; and page 87, figure 2.12***).

10.21.1. Regarding (***page 591, Definition 14.3, Stratified sampling; and page 87, figure 2.12***); it would have been obvious that the number of strata is the bin number.

10.22. Regarding claim 19, Freund appears to teach that in step e) of claim 15 where a vector is selected from each bin, one of the plurality of system vectors is identified as having a value for a selected parameter closest to a bin magnitude of each bin, identified ones being selected for initial inclusion in a training set (***page 591, Definition 14.3, Stratified sampling; and page 87, figure 2.12***).

10.22.1. Regarding (***page 591, Definition 14.3, Stratified sampling; and page 87, figure 2.12***); it would have been obvious to identify one of the plurality of system vectors as having a value for a selected parameter closest to a bin magnitude of each bin, identified ones being selected for initial inclusion in a training set.

10.23. Regarding claim 20, Freund appears to teach that in step e) of claim 15 where a vector is selected from each bin, one of the plurality of system vectors is identified as having a value for a selected parameter closest to but not exceeding a bin magnitude of each bin, identified ones being selected for initial inclusion in a training set (***page 591, Definition 14.3, Stratified sampling; and page 87, figure 2.12***).

10.23.1. Regarding (***page 591, Definition 14.3, Stratified sampling; and page 87, figure 2.12***); it would have been obvious to identify one of the plurality of system vectors as having a value for a selected parameter closest to but not exceeding a bin magnitude of each bin, identified ones being selected for initial inclusion in a training set.

10.24. Regarding claim 21, Freund appears to teach that in step e) of claim 15 where a vector is selected from each bin, one of the plurality of system vectors is identified as having a value for a selected parameter closest to but not less than a bin magnitude of each bin, identified

ones being selected for initial inclusion in a training set (***page 591, Definition 14.3, Stratified sampling; and page 87, figure 2.12***).

10.24.1. Regarding (***page 591, Definition 14.3, Stratified sampling; and page 87, figure 2.12***); it would have been obvious to identify one of the plurality of system vectors as having a value for a selected parameter closest to but not less than a bin magnitude of each bin, identified ones being selected for initial inclusion in a training set.

10.25. Regarding claims 1, 8, 13, and 32, Passera appears to teach computer readable program code (***column 6, lines 1 – 65***).

10.26. Regarding claims 1, 8, 13, and 32, Klimasauskas appears to teach time-correlated data (***column 4, lines 60 – 67; and column 5, lines 1 – 5***).

10.27. Regarding claim 14, Passera appears to teach that selecting a system parameter comprises identifying dominant driver parameters (***column 2, lines 1 – 13***).

10.28. Regarding all claims:

10.29. The art of Freund and the art of Black are analogous art because Black provides a form of a multiple regression process (***Black, Abstract***), which is a field of statistical methods of Freund (***page x***).

10.30. The art of Klimasauskas and the art of Black are analogous art because they both contain similar problem solving areas of multiple regression models that are trained using a training data set (***Klimasauskas, column 3, lines 20 – 55***).

10.31. The art of Passera and the art of Black are analogous art because they both contain the problem solving area of determining the most relevant parameters that contribute to a model prediction (***Black, pages 58.05 – 58.06, section labeled "Demonstration of***

application of nset to modeling of selected high flux isotope reactor (hfir) variables") and (***Passera, column 3, lines 29 – 31***).

10.32. Regarding claim 19, the motivation to use the art of Freund with the art of Black would have been obvious because the method of claim 19 provides uniform selection of parameter values across the range of values.

10.33. Regarding claim 20, the motivation to use the art of Freund with the art of Black would have been obvious because the method of claim 20 provides a method that is easy to implement.

10.34. Regarding claim 21, the motivation to use the art of Freund with the art of Black would have been obvious because the method of claim 21 provides a method that is easy to implement.

10.35. Regarding claims 1, 4, 5, 8, 11, 13, 14, 15, 32, 34, and 35:

10.36. The motivation to use the art of Freund with the art of Black would have been obvious given the need recited in Black for a compact set of prototypes to represent the dynamic range of a system (***pages 58.01 – 58.02, section labeled "Introduction"***), and the statement in Passera that a training data set is generally created using stratified sampling of a large database (***column 3, lines 13 – 19***), which results in a more compact data set that represents the larger database (***column 3, lines 13 – 19***).

10.37. The motivation to combine the art of Passera with the art of Black would have been obvious given the benefit recited in Passera that a model can be created using only the parameters that are salient to the problem being modeled (***column 1, lines 26 – 32***), which would improve performance.

10.38. The motivation to combine the art of Klimasauskas with the art of Black would have been obvious given the statement recited in Klimasauskas that it is necessary to delay or time-shift the sensor data in order to properly associate the sensor measurements with particular process control steps (***column 5, lines 1 - 5***).

10.39. Therefore, as discussed above, it would have been obvious to the ordinary artisan at the time of invention to use the art of Freund and the art of Passera and the art of Klimasauskas with the art of Black to produce the claimed inventions.

11. Claims 6, 7, 12, 16, 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Black (Black, Christopher L.; Uhrig, Robert E.; Hines, J. Wesley; "System Modeling and Instrument Calibration Verification with a Nonlinear State Estimation Technique", Maintenance and Reliability Conference Proceedings, May 12 – 14, 1998) and Freund (Freund, Rudolf J.; Wilson, William J.; "Statistical Methods", 1993), and Klimasauskas (U.S. Patent Number 6,278,962), and Passera (U.S. Patent 6,272,449), further in view of Rubinstein (Rubinstein, Reuven Y.; "Simulation and the Monte Carlo Method", 1981, John Wiley & Sons).

11.1. The art of Rubinstein is directed toward system simulation and the monte carlo method (Title).

11.2. Regarding claims 6, 12 and 36, Black does not specifically teach ordering the set of vectors so as to provide a cumulative density function for the particular sensor.

11.3. Regarding claims 7 and 37, Black does not specifically teach that a vector is selected from one of the equally spaced ranges through the cumulative density function such that the selected vector is the vector with a sensor value highest within the range.

11.4. Regarding claim 16, Black does not specifically teach that the bin number provided for dominant driver parameters is greater than the bin number used for all other parameters.

11.5. Regarding claims 6, 12 and 36, Rubinstein appears to teach ordering the set of vectors so as to provide a cumulative density function for the particular sensor (***page 121, section 4.3 Variance Reduction Techniques; and page 122, section 4.3.1 Importance Sampling, especially the second paragraph that starts with "The basic idea . . ."***).

11.5.1. Regarding (***page 121, section 4.3 Variance Reduction Techniques; and page 122, section 4.3.1 Importance Sampling, especially the second paragraph that starts with "The basic idea . . ."***); it would have been obvious to order the set of vectors so as to provide a cumulative density function for the particular sensor in order to provide a basis for importance sampling.

11.6. Regarding claims 7 and 37, Rubinstein appears to teach that a vector is selected from one of the equally spaced ranges through the cumulative density function such that the selected vector is the vector with a sensor value highest within the range (***page 121, section 4.3 Variance Reduction Techniques; and page 122, section 4.3.1 Importance Sampling, especially the second paragraph that starts with "The basic idea . . ."***).

11.6.1. Regarding (***page 121, section 4.3 Variance Reduction Techniques; and page 122, section 4.3.1 Importance Sampling, especially the second paragraph that starts with "The basic idea . . ."***); it would have been obvious to select a vector from one of the equally spaced ranges through the cumulative density function such that the selected vector is the vector with a sensor value highest within the range because the data is ordered and selecting the highest sensor value in the range is easy to implement.

11.7. Regarding claim 16, Rubinstein appears to teach that the bin number provided for dominant driver parameters is greater than the bin number used for all other parameters (***page 121, section 4.3 Variance Reduction Techniques; and page 122, section 4.3.1 Importance Sampling, especially the second paragraph that starts with "The basic idea . . ."***).

11.7.1. Regarding (***page 121, section 4.3 Variance Reduction Techniques; and page 122, section 4.3.1 Importance Sampling, especially the second paragraph that starts with "The basic idea . . ."***); it would have been obvious that the bin number provided for dominant driver parameters is greater than the bin number used for all other parameters in order to concentrate the distribution of sample points in parts of range of parameters that are most important.

11.8. Regarding all claims:

11.9. The art of Rubinstein and the art of Black are analogous art because they both contain the problem of sampling data that is most important (***Black, page 58.06***) and (***Rubinstein, page 122, section 4.3.1 Importance Sampling, especially the second paragraph that starts with "The basic idea . . ."***).

11.10. The motivation to use the art of Black with the art of Rubinstein would have been obvious given the statement in Rubinstein that importance sampling allows the selection of data that is most important (***Rubinstein, page 122, section 4.3.1 Importance Sampling, especially the second paragraph that starts with "The basic idea . . ."***).

12. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Black (Black, Christopher L.; Uhrig, Robert E.; Hines, J. Wesley; "System Modeling and Instrument Calibration Verification with a Nonlinear State Estimation Technique", Maintenance and Reliability Conference Proceedings, May 12 – 14, 1998) and Freund (Freund, Rudolf J.; Wilson, William J.; "Statistical Methods", 1993), and Klimasauskas (U.S. Patent Number 6,278,962), and Passera (U.S. Patent 6,272,449), in view of common knowledge in the art.

12.1. Claims 17 and 18 are dependent claims of claim 15, and thereby inherit all of the rejected limitations of claim 15.

12.2. Regarding claim 17, Black does not specifically teach ordering the system vectors in ascending magnitude order for the selected parameter.

12.3. Regarding claim 18, Black does not specifically teach ordering the system vectors in descending magnitude order for the selected parameter.

12.4. Regarding claim 17, Official notice is taken that it was old and well known in the art at the time of invention to order a list of vectors in ascending magnitude order for a selected parameter.

12.5. Regarding claim 18, Official notice is taken that it was old and well known in the art at the time of invention to order a list of vectors in descending magnitude order for a selected parameter.

12.6. Regarding claims 17 and 18, the motivation to combine would have been the ease of processing a sorted list for purposes of binning and selecting a vector.

13. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Black (Black, Christopher L.; Uhrig, Robert E.; Hines, J. Wesley; "System Modeling and Instrument Calibration Verification with a Nonlinear State Estimation Technique", Maintenance and Reliability Conference Proceedings, May 12 – 14, 1998) in view of Freund (Freund, Rudolf J.; Wilson, William J.; "Statistical Methods", 1993), further in view of Klimasauskas (U.S. Patent Number 6,278,962), further in view of Passera (U.S. Patent 6,272,449).

13.1. The art of Black is directed toward system modeling and instrument calibration verification with a nonlinear state estimation technique (***Title and Abstract***).

13.2. The art of Freund is directed to statistical methods (***Title***).

13.3. The art of Klimasauskas is directed to a method for adaptively modeling and controlling an industrial process (***column 1, lines 7 – 13***).

13.4. The art of Passera is directed toward a process for providing a description of a model that indicates the sensitivity of the model in subspaces of the input space (***column 1, lines 60 – 63***).

13.5. Black appears to teach a data acquisition unit receiving information from a monitored system and providing system snapshots therefrom, system snapshots representing the state of said monitored system relative to the time the snapshot is taken (***pages 58.05 – 58.06, sections labeled "Instrument Calibration Verification System" and "Demonstration of application of nset to modeling of selected high flux isotope reactor (hfir) variables"***); a memory storing said system snapshots (***pages 58.05, section labeled "Instrument Calibration Verification System" and the unlabeled figure***).

13.6. Black appears to teach a selected vector being a system snapshot provided for initial inclusion in a training set (***page 58.06, second paragraph starting with the phrase "The constructed datafile . . ."***).

13.7. Black does not specifically teach a data acquisition unit receiving information ***from a control unit and*** from a monitored system and providing system snapshots therefrom, system snapshots representing the state of said monitored system relative to the time the snapshot is taken.

13.8. Black does not specifically teach ***a control unit controlling a monitored system***.

13.9. Black does not specifically teach ***a sorter sorting collected*** system snapshots ***responsive to a selected system parameter***.

13.10. Black does not specifically teach ***a vector selector binning sorted snapshots and selecting a vector from each bin and, said*** selected vector being a system snapshot provided for initial inclusion in a training set.

13.11. Klimasauskas appears to teach a control unit controlling a monitored system (***figure 1***).

13.12. Klimasauskas appears to teach a data acquisition unit receiving information ***from a control unit and*** from a monitored system (***figure 1***).

13.13. Freund appears to teach ***a sorter sorting collected system snapshots responsive to a selected system parameter***, and ***a vector selector binning sorted snapshots and selecting a vector from each bin*** (***page 591, Definition 14.3, Stratified sampling; and page 87, figure 2.12***).

13.13.1. Regarding (***page 591, Definition 14.3, Stratified sampling; and page 87, figure 2.12***); it would have been obvious to sort system snapshot vectors according to a selected system parameter for ease of processing.

13.14. The art of Freund and the art of Black are analogous art because Black provides a form of a multiple regression process (***Black, Abstract***), which is a field of statistical methods of Freund (***page x***).

13.15. The art of Passera and the art of Black are analogous art because they both contain the problem solving area of determining the most relevant parameters that contribute to a model prediction (***Black, pages 58.05 – 58.06, section labeled "Demonstration of application of nset to modeling of selected high flux isotope reactor (hfir) variables"***) and (***Passera, column 3, lines 29 – 31***).

13.16. The art of Klimasauskas and the art of Black are analogous art because they both contain similar problem solving areas of multiple regression models that are trained using a training data set (***Klimasauskas, column 3, lines 20 – 55***) and (***Black, page 58.01, Abstract***).

13.17. The motivation to combine the art of Freund with the art of Black would have been obvious given the need recited in Black for a compact set of prototypes to represent the dynamic range of a system (***pages 58.01 – 58.02, section labeled "Introduction"***), and the statement in Passera that a training data set is generally created using stratified sampling of a large database (***column 3, lines 13 – 19***), which results in a more compact data set that represents the larger database (***column 3, lines 13 – 19***).

13.18. The motivation to combine the art of Passera with the art of Black would have been obvious given the benefit recited in Passera that a model can be created using only the parameters that are salient to the problem being modeled (***column 1, lines 26 – 32***).

13.19. The motivation to combine the art of Klimasauskas with the art of Black would have been obvious given the ease of collecting data in a single existing computer (***column 5, lines 5 – 52***), and the ease of storing the data for historical use on the same computer (***column 5, lines 5 – 52***).

13.20. Therefore, as discussed above, it would have been obvious to the ordinary artisan at the time of invention to use the art of Freund and the art of Passera and the art of Klimasauskas with the art of Black to produce the claimed inventions.

14. Claims 2, 3, 9, 10, 33 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Black (Black, Christopher L.; Uhrig, Robert E.; Hines, J. Wesley; "System Modeling and Instrument Calibration Verification with a Nonlinear State Estimation Technique", Maintenance and Reliability Conference Proceedings, May 12 – 14, 1998) and Freund (Freund, Rudolf J.; Wilson, William J.; "Statistical Methods", 1993), and Klimasauskas (U.S. Patent Number 6,278,962), and Passera (U.S. Patent 6,272,449), in view of Gross (U.S. Patent Number 5,764,509).

14.1. The art of Gross is directed toward building a system model of sensor values for an industrial process, and identifying deviations from normalcy (***Abstract***).

14.2. Regarding claims 2, 9, and 33:

14.2.1. Black does not specifically teach including in a training set each vector that contains a minimum or a maximum value for any given sensor across the set of training vectors.

14.2.2. Gross appears to teach including in a training set each vector that contains a minimum or a maximum value for any given sensor across the set of training vectors (***column 5, lines 52 – 67***).

14.2.3. The art of Black and the art of Gross are analogous art because they both build a model of sensor values for a process (***Gross, figure 1, item 40; and column 6, lines 1 – 55***).

14.2.4. The motivation to use the art of Gross with the art of Black would have been obvious given the statement recited in Gross that the training set produced is optimal (***column 5, lines 52 – 67***).

14.3. Regarding claims 3 and 50:

14.3.1. Black does not specifically teach carrying out the ordering, dividing, and selecting steps for each sensor represented in the set of training vectors.

14.3.2. Gross appears to teach carrying out the ordering, dividing, and selecting steps for each sensor represented in the set of training vectors (***figure 3***).

14.3.2.1. Regarding (***figure 3***); because each sensor is included in building the training set, it would have been obvious to carry out the ordering, dividing, and selecting steps for each sensor represented in the set of training vectors.

14.4. Regarding claim 10:

14.4.1. Black does not specifically teach selection of observations representative of regularly spaced intervals is performed for an ordering for each sensor in the system.

14.4.2. Freund appears to teach selection of observations representative of regularly spaced intervals is performed for an ordering for ***a*** sensor in the system (***page 591, Definition 14.3, Stratified sampling; and page 87, figure 2.12***).

14.4.2.1. Regarding (***page 591, Definition 14.3, Stratified sampling; and page 87, figure 2.12***); it would have been obvious to select observations representative of regularly spaced intervals for a sensor.

14.4.3. Gross appears to teach carrying out the selecting steps for each sensor represented in the system (***figure 3***).

14.4.3.1. Regarding (***figure 3***); because each sensor is included in building the training set, it would have been obvious to carry out the ordering, dividing, and selecting steps for each sensor represented in the set of training vectors.

14.4.4. The motivation to use the art of Freund with the art of Black would have been obvious because it provided a compact representation of the dynamic range of parameter values of the system, which would include the functional dependencies between all of the sensors.

14.5. Regarding all claims:

14.5.1. The art of Black and the art of Gross are analogous art because they both build a model of sensor values for a process (***Gross, figure 1, item 40; and column 6, lines 1 – 55***).

14.5.2. The motivation to use the art of Gross with the art of Black would have been obvious because including all of the represented sensors would allow all of the functional dependencies between the sensors to be modeled.

15. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Black (Black, Christopher L.; Uhrig, Robert E.; Hines, J. Wesley; "System Modeling and Instrument Calibration Verification with a Nonlinear State Estimation Technique", Maintenance and Reliability Conference Proceedings, May 12 – 14, 1998) and Freund (Freund, Rudolf J.; Wilson, William J.; "Statistical Methods", 1993), and Klimasauskas (U.S. Patent Number 6,278,962), and Passera (U.S. Patent 6,272,449), in view of Wong (Wong, Man To; Geva, S.; Orlowski, M.; "Pattern recognition from neural network with functional dependency preprocessing", 1997, Proceedings of IEEE Speech and Technologies for Computing and Telecommunications), further in view of common knowledge in the art.

15.1. Claim 25 is a dependent claim of claim 15, and thereby inherits all of the rejected limitations of claim 15.

15.2. The art of Wong is directed to enhancing pattern recognition by preprocessing data to identify functional dependencies (***page 387,Abstract***).

15.3. Black appears to teach storing selected vectors as a training set for modeling and monitoring system operation (***page 58.05, section labeled "Instrument Calibration Verification System"; and pages 58.05 – 58.06, section "Demonstration of application of nset to modeling of selected high flux isotope reactor (hfir) variables"***).

15.4. Black does not specifically teach:

15.4.1. ***Checking system parameters to determine if other parameters remain unselected, and if other parameters are determined to remain unselected,***

15.4.2. ***Selecting an unselected parameter, the unselected parameter being identified as the selected parameter,***

15.4.3. ***Returning to step c) and repeating steps c) through h) until all system parameters have been selected, otherwise,***

15.4.4. ***Eliminating redundant selected vectors,***

15.4.5. Storing the selected vectors as a training set for modeling and monitoring system operation.

15.5. Passera appears to teach system parameter***s*** (***column 3, lines 4 – 12***).

15.6. Official Notice is taken that it was old and well known by an ordinary artisan at the time of invention to repeat an operation for all elements in a list. The motivation to use the art of Black with the common knowledge would have been to provide a set of training vectors that span the full dynamic range of each parameter so as to model the system across its range of operation (***Black, page 58.02, section labeled "Multiple Regression"***).

15.7. Wong appears to teach eliminating redundant selected vectors (***page 389, right-side column, last paragraph; and page 390, left-side column, first paragraph***).

15.8. The art of Wong and the art of Black are analogous art because they both are directed toward a similar problem solving area; they both use training data to train a model (***Black, pages 58.01 – 58.02, section labeled "Introduction"***) and (***Wong, page 387, Abstract***).

15.9. The motivation to use the art of Wong with the art of Black would have been obvious given the statements in Black that speed and performance are dependent upon the size of the

training data, and the need to compactly represent the entire dynamic range of the system (***Black, pages 58.01 – 58.02, section labeled "Introduction"***).

16. Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over Black (Black, Christopher L.; Uhrig, Robert E.; Hines, J. Wesley; "System Modeling and Instrument Calibration Verification with a Nonlinear State Estimation Technique", Maintenance and Reliability Conference Proceedings, May 12 – 14, 1998) and Freund (Freund, Rudolf J.; Wilson, William J.; "Statistical Methods", 1993), and Klimasauskas (U.S. Patent Number 6,278,962), and Passera (U.S. Patent 6,272,449), and Gross (U.S. Patent Number 5,764,509), in view of Wong (Wong, Man To; Geva, S.; Orlowski, M.; "Pattern recognition from neural network with functional dependency preprocessing", 1997, Proceedings of IEEE Speech and Technologies for Computing and Telecommunications).

16.1. The art of Wong is directed to enhancing pattern recognition by preprocessing data to identify functional dependencies (***page 387,Abstract***).

16.2. Black does not appear to teach means for eliminating redundant vectors.

16.3. Wong appears to teach eliminating redundant selected vectors (***page 389, right-side column, last paragraph; and page 390, left-side column, first paragraph***).

16.4. The art of Wong and the art of Black are analogous art because they both are directed toward a similar problem solving area; they both use training data to train a model (***Black, pages 58.01 – 58.02, section labeled "Introduction"***) and (***Wong, page 387, Abstract***).

16.5. The motivation to use the art of Wong with the art of Black would have been obvious given the statements in Black that speed and performance are dependent upon the size of the training data, and the need to compactly represent the entire dynamic range of the system (***Black, pages 58.01 – 58.02, section labeled "Introduction"***).

17. Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Black (Black, Christopher L.; Uhrig, Robert E.; Hines, J. Wesley; "System Modeling and Instrument Calibration Verification with a Nonlinear State Estimation Technique", Maintenance and Reliability Conference Proceedings, May 12 – 14, 1998) and Freund (Freund, Rudolf J.; Wilson, William J.; "Statistical Methods", 1993), and Klimasauskas (U.S. Patent Number 6,278,962), and Passera (U.S. Patent 6,272,449), in view of Wong (Wong, Man To; Geva, S.; Orlowski, M.; "Pattern recognition from neural network with functional dependency preprocessing", 1997, Proceedings of IEEE Speech and Technologies for Computing and Telecommunications).

17.1. Claim 27 is a dependent claim of claim 26, and thereby inherits all of the rejected limitations of claim 26.

17.2. Claim 28 is a dependent claim of claim 27, and thereby inherits all of the rejected limitations of claim 27.

17.3. The art of Wong is directed to enhancing pattern recognition by preprocessing data to identify functional dependencies (***page 387,Abstract***).

17.4. Regarding claim 27, Black appears to teach a memory for storing a training set (***pages 58.05 – 58.06, sections labeled "Instrument Calibration Verification System" and "Demonstration of application of nset to modeling of selected high flux isotope reactor (hfir) variables"***).

17.5. Regarding claim 27, Black does not appear to teach means for eliminating redundant collected vectors, the remaining vectors forming a training set.

17.6. Regarding claim 28, Black does not specifically teach that a vector selector divides the range of said selected system parameter into a plurality of evenly spaced bins and selects a sorted snapshot from each bin as the selected vector, each said selected vector being identified as having a parameter value closest to a corresponding bin value.

17.7. Regarding claim 28, Freund appears to teach that a vector selector divides the range of a selected system parameter into a plurality of evenly spaced bins and selects a sorted snapshot from each bin as the selected vector, each said selected vector being identified as having a parameter value closest to a corresponding bin value (***page 591, Definition 14.3, Stratified sampling; and page 87, figure 2.12***).

17.7.1. Regarding (***page 591, Definition 14.3, Stratified sampling; and page 87, figure 2.12***); it would have been obvious that a vector selector divides the range of a selected system parameter into a plurality of evenly spaced bins and selects a sorted snapshot from each bin as the selected vector, each said selected vector being identified as having a parameter value closest to a corresponding bin value.

17.8. Regarding claim 27, Wong appears to teach eliminating redundant selected vectors, the remaining vectors forming a training set (***page 389, right-side column, last paragraph; and page 390, left-side column, first paragraph***).

17.9. Regarding claims 27 and 28, the art of Wong and the art of Black are analogous art because they both are directed toward a similar problem solving area; they both use training data to train a model (***Black, pages 58.01 – 58.02, section labeled "Introduction"***) and (***Wong, page 387, Abstract***).

17.10. Regarding claim 27, the motivation to use the art of Wong with the art of Black would have been obvious given the statements in Black that speed and performance are dependent upon the size of the training data, and the need to compactly represent the entire dynamic range of the system (***Black, pages 58.01 – 58.02, section labeled "Introduction"***).

17.11. Regarding claim 28, the motivation to use the art of Freund with the art of Black would have been obvious because the method of claim 28 provides uniform selection of parameter values across the range of values.

18. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Black (Black, Christopher L.; Uhrig, Robert E.; Hines, J. Wesley; "System Modeling and Instrument Calibration Verification with a Nonlinear State Estimation Technique", Maintenance and Reliability Conference Proceedings, May 12 – 14, 1998) and Freund (Freund, Rudolf J.; Wilson, William J.; "Statistical Methods", 1993), and Klimasauskas (U.S. Patent Number 6,278,962), and Passera (U.S. Patent 6,272,449), in view of Rubinstein (Rubinstein, Reuven Y.; "Simulation and the Monte Carlo Method", 1981, John Wiley & Sons).

18.1. Claim 31 is a dependent claim of claim 26, and thereby inherits all of the rejected limitations of claim 26.

18.2. The art of Rubinstein is directed toward system simulation and the monte carlo method (***Title***).

18.3. Regarding claim 31, Black does not specifically teach that the vector selector divides the the range of said selected system parameter into bins having equal number of system snapshots.

18.4. Regarding claim 31, Rubinstein appears to teach that the vector selector divides the the range of said selected system parameter into bins having equal number of system snapshots (***page 121, section 4.3 Variance Reduction Techniques; and page 122, section 4.3.1 Importance Sampling, especially the second paragraph that starts with "The basic idea . . ."***).

18.4.1. Regarding (***page 121, section 4.3 Variance Reduction Techniques; and page 122, section 4.3.1 Importance Sampling, especially the second paragraph that starts with "The basic idea . . ."***); it would have been obvious that the vector selector divides the the range of said selected system parameter into bins having equal

number of system snapshots in order to concentrate the distribution of sample points in parts of range of parameters that are most important (densely populated).

18.5. The art of Rubinstein and the art of Black are analogous art because they both contain the problem of sampling data that is most important (***Black, page 58.06***) and (***Rubinstein, page 122, section 4.3.1 Importance Sampling, especially the second paragraph that starts with "The basic idea . . ."***).

18.6. The motivation to use the art of Black with the art of Rubinstein would have been obvious given the statement in Rubinstein that importance sampling allows the selection of data that is most important (***Rubinstein, page 122, section 4.3.1 Importance Sampling, especially the second paragraph that starts with "The basic idea . . ."***).

Conclusion

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russell L. Guill whose telephone number is 571-272-7955. The examiner can normally be reached on Monday – Friday 9:00 AM – 5:30 PM.

20. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Teska can be reached on 571-272-3716. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Any inquiry of a general nature or relating to the status of this application should be directed to the TC2100 Group Receptionist: 571-272-2100.

21. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RG

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